APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/782,098	02/13/2001	Lothar B. Moeller	Moeller 9-12	2771

26291   7590   12/19/2003

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CURS, NATHAN M

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/782,098	MOELLER ET AL.
	Examiner	Art Unit
	Nathan Curs	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _13 February 2001_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-38_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-7 and 9-38_ is/are rejected.

7)☒ Claim(s) _8 and 15_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _13 February 2001_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

    a)☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _2 and 6_.

4)☐ Interview Summary (PTO-413) Paper No(s). _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: .

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which

is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected

drawings are required in reply to the Office action to avoid abandonment of the application. The

objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 15 is objected to because of the following informalities: the claim was examined

assuming the phrase "optical powers measured in (e)" was intended to be "optical powers

measured in (f)". Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

4. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Regarding claim 14, the claim is unclear, stating "the at least one desired property" are

two properties, "the polarization state and an optical power of the optical signal". It's not clear if

the applicant intended to disclose the options for the one desired property as one specific

property or one of two alternative properties.

Claim Rejections - 35 USC § 102

5.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6.   Claims 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Erdogan et al.

(US Patent No. 6211957).

The applied reference has a common inventer with the instant application. Based upon

the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C.

102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37

CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not the invention "by another," or by an appropriate

showing under 37 CFR 1.131.

Regarding claim 19, Erdogan et al. disclose an apparatus for polarization measurement,

comprising: a polarization controller for receiving an optical signal and a polarizer for receiving

the optical signal exiting the polarization controller (fig. 6, element 62, col. 4, lines 48-50 and col.

10, lines 52-56), where the quarter-wave plate is inherently a polarization controller; a

wavelength dispersive element for separating the optical signal exiting the polarizer into a

plurality of spectral components, and a photo-detector for detecting the plurality of spectral

components (col. 11, lines 19-34).

Regarding claim 20, Erdogan et al. in view of Favin et al. disclose that the wavelength

dispersive element is a grating (Erdogan et al.: col. 11, lines 19-34).

Regarding claim 21, Erdogan et al. in view of Favin et al. disclose that the photo-detector is a photodiode array (Erdogan et al.: col. 1, lines 45-48 and col. 11, lines 19-34).

7.   Claims 25-27 rejected under 35 U.S.C. 102(e) as being anticipated by Moeller (US Published Patent Application No. 09/518296).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claim 25, Moeller discloses a system for determining polarization mode dispersion in a transmission system, comprising: propagating a data signal characterized by a wavelength range through an optical fiber in the transmission system and determining the polarization mode dispersion in the optical fiber (paragraphs 0006 to 0008) by: directing a portion of the data signal into a polarization analyzer (paragraph 0007 and fig. 1, element 140) and measuring optical powers for the portion of the data signal as a function of wavelength within the wavelength range (paragraphs 0008 and 0009); and generating polarization parameters from the optical powers measured (paragraph 0009).

Regarding claim 26, Moeller discloses directing the data signal through a polarization switch (paragraph 0007 and fig. 1, element 120).

Regarding claim 27, Moeller discloses measurements for two different and non-orthogonal polarization states of the data signal generated by the polarization switch (fig. 1 and paragraph 0009).

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 1-7 and 9-18 are rejected under 35 U.S.C. 103(a) as being obvious over Erdogan

et al. (US Patent No. 6211957) in view of Favin et al. (US Patent No. 5371597).

The applied reference has a common inventor with the instant application. Based upon

the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C.

102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37

CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the

inventor of this application and is thus not an invention "by another"; (2) a showing of a date of

invention for the claimed subject matter of the application which corresponds to subject matter

disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference

under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the

application and reference are currently owned by the same party and that the inventor named in

the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in

accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this

rejection might also be overcome by showing that the subject matter of the reference and the

claimed invention were, at the time the invention was made, owned by the same person or

subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and §

706.02(l)(2).

Regarding claim 1, Erdogan et al. disclose a method of polarization measurement, comprising: directing an optical signal characterized by a polarization state into a polarization controller and directing the optical signal from the polarization controller into a polarizer (fig. 6, element 62, and col. 4, lines 48-50 and col. 10, lines 52-56), where the quarter-wave plate is inherently a polarization controller; directing the optical signal from the polarizer to four wavelength dispersive elements at different rotations (col. 5, lines 1-60) to generate a dispersed optical signal comprising a plurality of spectral components each characterized by a wavelength range and by one of four polarization measurements and directing the four dispersed optical signals into four photo-detectors for detecting the plurality of spectral components for each of the four polarization measurements, and measuring the power of the optical signal using the photo-detector (col. 1, lines 45-65, and col. 11, lines 19-40); and (g) obtaining the polarization state of the optical signal by analyzing the powers of the optical signal (col. 2, lines 11-24; col. 6, line 23 to col. 7, line 14, and col. 10, lines 52-59). Erdogan et al. do not disclose (e) setting the polarization controller to a plurality of positions. Favin et al. disclose an optical signal going through a polarizer and polarization controller and setting the polarization controller to a plurality of positions in obtaining four different polarization measurements (col. 4, line 61 to col. 5, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention that a rotating polarization controller could be used, as disclosed by Favin et al., to obtain the four different polarization measurements in the apparatus of Erdogan et al., eliminating the need for four different wavelength dispersive elements each set at a different rotation, and four different detectors corresponding to the four dispersive elements, for obtaining the four different polarization measurements.

Regarding claim 2, Erdogan et al. in view of Favin et al. disclose that the photo-detector is a photodiode array comprising a plurality of detector pixels (Erdogan et al.: col. 1, lines 45-65 and col. 11, lines 19-34).

Regarding claim 3, Erdogan et al. in view of Favin et al. disclose that a detector pixel detects only a portion of the dispersed optical signal, the portion having a Stokes vector that remains substantially constant within a detector of the detector array (Erdogan et al.: col. 6, line 23 to col. 7, line 14; col. 10, lines 52-59; and col. 11, lines 19-34), but do not disclose that a subset of the plurality of detector pixels each detects only a portion of the dispersed optical signal having a Stokes vector that remains substantially constant within each of the detector pixels in the subset of detector pixels. It would have been obvious to one of ordinary skill in the art at the time of the invention that the detector array could be placed at the appropriate proximity to the dispersive element, such that each spectral component having a Stokes vector could be detected by more than one detector pixel within the detector array.

Regarding claim 4, Erdogan et al. in view of Favin et al. disclose setting the polarization controller to at least four different positions (Erdogan et al.: col. 2, lines 11-24; and Favin et al.: col. 4, line 61 to col. 5, line 18).

Regarding claim 5, Erdogan et al. in view of Favin et al. disclose generating an optical power parameter for each of the subset of the plurality of detector pixels; analyzing the optical power parameters and the corresponding wavelength ranges detected by the subset of the plurality of detector pixels; and calculating Stokes components for the optical signal to obtain the polarization state of the optical signal (Erdogan et al.: col. 1, line 66 to col. 2, line 24; col. 6, line 23 to col. 7, line 14; col. 10, lines 52-59; and col. 11, lines 19-40).

Regarding claim 6, Erdogan et al. in view of Favin et al. disclose (h) calculating an optical power for the optical signal (Erdogan et al.: col. 6, line 23 to col. 7, line 14; col. 10, lines 52-59; and col. 11, lines 19-34).

Regarding claim 7, Erdogan et al. in view of Favin et al. disclose that the optical signal is a data signal (Erdogan et al.: col. 1, lines 10-22) in a multi-wavelength system and one or more of the plurality of spectral components in the dispersed optical signal corresponds to a plurality of wavelengths (Erdogan et al.: col. 11, lines 19-34); where an optical multi-wavelength data signal system is inherently a WDM system.

Regarding claim 9, Erodogan et al. disclose that the polarization controller is a quarter-wave plate (fig. 6, element 62, and col. 4, lines 48-50 and col. 10, lines 52-59), but do not disclose rotating the quarter-wave plate continuously as a function of time. Favin et al. disclose an optical signal going through a polarizer and polarization controller and rotating the quarter-wave plate of a polarization controller using an electric motor connected to an electronic controller (col. 4, line 61 to col. 5, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the electric motor and electronic controller with quarter-wave plate, disclosed by Favin et al., in the system of Erdogan et al. so that quarter-wave plate could be rotated continuously as function of time, so that the polarization measurements could be taken for the optical signal over time to detect any changes in polarization state.

Regarding claim 10, Erdogan et al. in view of Favin et al. disclose four polarization measurements taken for the plurality of spectral components that can be used to calculate the Stokes parameters for each wavelength (Erdogan et al.: col. 2, lines 11-24; col. 6, line 23 to col. 7, line 14; col. 10, lines 52-59; and col. 11, lines 19-40), where the wavelength resolution of the wavelength dispersive element is controlled using chirp in the grating (Erdogan et al.: col. 11, lines 19-34). Erdogan et al. in view of Favin et al. do not disclose a Stokes vector that varies

within the wavelength range of a spectral component; however, it would have been obvious to one of ordinary skill in the art at the time of the invention that the wavelength resolution of the dispersive element could be controlled, as disclosed by Erdogon et al., in order to produce a spectral component wavelength range such that the Stokes vector varies within the spectral component wavelength range.

Regarding claim 11, Erdogan et al. disclose a method of polarization measurement, comprising: directing an optical signal characterized by a polarization state into a polarization controller and directing the optical signal from the polarization controller into a polarizer (fig. 6, element 62, and col. 4, lines 48-50 and col. 10, lines 52-56), where the quarter-wave plate is inherently a polarization controller; directing the optical signal from the polarizer to four wavelength dispersive elements at different rotations (col. 5, lines 1-60) to generate a dispersed optical signal comprising a plurality of spectral components each characterized by a wavelength range and by one of four polarization measurements and directing the four dispersed optical signals into four photo-detectors for detecting the plurality of spectral components for each of the four polarization measurements, and measuring the power of the dispersed optical signal using the photo-detector (col. 1, lines 45-65; and col. 11, lines 19-40); and obtaining at least one desired property of the optical signal by analyzing the measured powers of the dispersed optical signal (col. 2, lines 11-24; col. 6, line 23 to col. 7, line 14; and col. 10, lines 48-59). Erdogan et al. do not disclose setting the polarization controller to a plurality of positions. Favin et al. disclose an optical signal going through a polarizer and a polarization controller and setting the polarization controller to a plurality of positions in obtaining four different polarization measurements (col. 4, line 61 to col. 5, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention that a rotating polarization controller, as disclosed by Favin et al., could be used to obtain the four different polarization measurements in the

apparatus of Erdogan et al., eliminating the need for four different wavelength dispersive

elements each set at a different rotation, and four different detectors corresponding to the four

dispersive elements, for obtaining the four different polarization measurements.

Regarding claim 12, Erdogan et al. in view of Favin et al. disclose that the plurality of

positions is at least two (Erdogan et al.: col. 2, lines 11-24; and Favin et al.: col. 4, line 61 to col.

5, line 18).

Regarding claim 13, Erdogan et al. in view of Favin et al. disclose that the at least one

desired property is a spectral power density of the optical signal (Erdogan et al.: col. 6, line 23 to

col. 7, line 14; col. 10, lines 52-59 and col. 11, lines 19-40).

Regarding claim 14, Erdogan et al. in view of Favin et al. disclose that the plurality of

positions is at least four, and the at least one desired property is the polarization state or an

optical power of the optical signal (Erdogan et al.: col. 2, lines 11-24; col. 6, line 23 to col. 7, line

14; col. 10, lines 52-59, and col. 11, lines 19-34).

Regarding claim 15, Erdogan et al. disclose a method of monitoring the degree of

polarization of an optical signal, comprising: directing an optical signal characterized by a

polarization state into a polarization controller and directing the optical signal from the

polarization controller into a polarizer (fig. 6, element 62, and col. 4, lines 48-50 and col. 10,

lines 52-56), where the quarter-wave plate is inherently a polarization controller; directing the

optical signal from the polarizer to four wavelength dispersive elements at different rotations

(col. 5, lines 1-60) to generate a dispersed optical signal comprising a plurality of spectral

components and directing the four dispersed optical signal into four photo-diode arrays

comprising a plurality of detector pixels for detecting the plurality of spectral components, and

measuring an optical power detected by each of the plurality of detector pixels (col. 1, lines 45-

65 and col. 11, lines 19-40); and obtaining the degree of polarization of the optical signal by

analyzing the optical powers measured in (f) (col. 2, lines 11-24; col. 6, line 23 to col. 7, line 14; and col. 10, lines 48-59). Erdogan et al. do not disclose setting the polarization controller to a plurality of positions. Favin et al. disclose an optical signal going through a polarizer and a polarization controller and setting the polarization controller to a plurality of positions in obtaining four different polarization measurements (col. 4, line 61 to col. 5, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention that a rotating polarization controller, as disclosed by Favin et al., could be used to obtain the four different polarization measurements in the apparatus of Erdogan et al., eliminating the need for four different wavelength dispersive elements each set at a different rotation, and four different detectors corresponding to the four dispersive elements, for obtaining the four different polarization measurements.

Regarding claim 16, Erdogan et al. in view of Favin et al. disclose that the optical signal is a data signal (col. 1, lines 10-22), in a multi-wavelength system where one or more of the plurality of spectral components in the dispersed optical signal corresponds to a plurality of wavelengths (Erdogan et al.: col. 11, lines 19-34); where an optical multi-wavelength data signal system is inherently a WDM system.

Regarding claim 17, Erdogan et al. in view of Favin et al. disclose that Erdogan et al. in view of Favin et al. disclose that a detector pixel detects one channel of the WDM signal dispersed by the dispersive element (Erdogan et al.: col. 6, line 23 to col. 7, line 14; col. 10, lines 52-59 and col. 11, lines 19-34), but do not disclose that each of the plurality of WDM channels is detected by a different subset of detector pixels. It would have been obvious to one of ordinary skill in the art at the time of the invention that the detector array could be placed at the appropriate proximity to the dispersive element, such that each spectral component of the

multi-wavelength signal having a Stokes vector could be detected by more than one detector

pixel within the detector array.

Regarding claim 18, Erdogan et al. in view Favin et al. disclose calculating Stokes

components corresponding to each of the plurality of WDM channels to obtain the degree of

polarization for each of the plurality of WDM channels (Erdogan et al.: col. 2, lines 11-24; col. 6,

line 23 to col. 7, line 14; col. 10, lines 52-59; and col. 11, lines 19-40).

10.   Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Erdogan

et al. (US Patent No. 6211957) in view of Damask (US Patent No. 6377719).

Regarding claims 22 and 23, Erdogan et al. do not disclose that the polarization

controller is a lithium niobate electro-optic device. Damask discloses an electro-optic lithium

niobate polarization controller used for transforming the state of polarization of a signal by

imparting a rotation on the waveguide (col. 4, lines 27-32). It would have been obvious to one

of ordinary skill in the art at the time of the invention to use an electro-optic lithium niobate

polarization controller, disclosed by Damask, in the system of Erdogan et al. in view of Favin et

al., because of the small size of a lithium niobate polarization controller.

Regarding claim 24, Erdogan et al. in view of Damask disclose that the wavelength

dispersive element has an optical resolution at least sufficient to resolve adjacent signal

channels in a wavelength division multiplexed communication system (Erdogan et al.: col. 11,

lines 19-34).

11.   Claims 28-30, 32-35, and 38 are rejected under 35 U.S.C. 103(a) as being obvious over

Moeller (US Published Patent Application No. 09/518296) in view of Erdogan et al. (US Patent

No. 6211957).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Regarding claim 28, Moeller does not disclose that the polarization analyzer comprises a polarization controller, a polarizer, a wavelength dispersive element and a photo-detector. Erdogoan et al. disclose a polarization analyzer comprising a polarization controller, a polarizer, a wavelength dispersive element and a photo-detector (col. 4, lines 48-50; col. 10, lines 52-59 and col. 11, lines 19-34). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the polarization analyzer disclosed by Erdogoan et al., in the system of Moeller, in order to make polarization measurements for multiple wavelengths simultaneously transmitted through the system.

Regarding claim 29, Moeller in view of Erdogan et al. disclose that directing the data

signal to a polarization analyser further comprises directing the portion of the data signal into the

polarization controller and directing the portion of the data signal from the polarization controller

into the polarizer (Erdogan et al.: fig. 6, element 62, and col. 4, lines 48-50 and col. 10, lines 52-

56), where the quarter-wave plate is inherently a polarization controller; and generating a

plurality of spectral components by directing the portion of the data signal from the polarizer

onto the wavelength dispersive element and directing the plurality of spectral components into

the photo-detector, wherein the photo-detector is a photo-detector array (Erdogan et al.: col. 11,

lines 19-34).

Regarding claim 30, Moeller in view of Erdogan et al. disclose that the optical signal is a

data signal (Erdogan et al.: col. 1, lines 10-22) in a multi-wavelength system and one or more of

the plurality of spectral components in the dispersed optical signal corresponds to a plurality of

wavelengths (Erdogan et al.: col. 11, lines 19-34); where an optical multi-wavelength data signal

system is inherently a WDM system.

Regarding claim 32, Moeller disclose a method of monitoring polarization mode

dispersion (PMD) in an optical fiber, comprising propagating an optical signal having a

wavelength range through the optical fiber (paragraphs 0006 to 0008); directing the optical

signal into a PMD compensator (fig. 1, element 112); determining a degree of polarization for

the optical signal by: directing a first portion of the optical signal from the PMD compensator into

a polarization analyzer (fig. 1, element 140 and paragraph 0007); calculating Stokes parameters

for the optical signal and obtaining the degree of polarization from the Stokes parameters for the

optical signal (paragraph 0028); deriving PMD information for the optical signal from the degree

of polarization and using the PMD information for the optical signal for controlling the PMD

compensator (paragraphs 0009 and 0036); and directing a second portion of the optical signal

from the PMD compensator into a receiver unit (fig. 1, element 114). Moeller discloses an

optical signal having a wavelength range, but does not disclose that the optical signal is a WDM

signal. Moeller also does not disclose that the polarization analyzer comprises a polarization

controller, a polarizer, a wavelength dispersive element and a photo-detector array, wherein

after the first portion of the WDM optical signal propagates through the polarization controller

and the polarizer, the wavelength dispersive element disperses the first portion of the WDM

optical signal into a plurality of spectral components corresponding to the plurality of WDM

channels; and the photo-detector array detects the plurality of spectral components. Erdogan et

al. discloses an optical multi-wavelength data signal (col. 1, lines 10-22 and col. 11, lines 19-

34), which is inherently a WDM signal, and discloses measuring power, calculating the Stokes

parameters, and determining a degree of polarization for each WDM channel (col. 2, lines 11-

24; col. 6, line 23 to col. 7, line 14 and col. 10, lines 48-59). Erdogan et al. also disclose that the

polarization analyzer comprises a polarization controller, a polarizer, a wavelength dispersive

element and a photo-detector array (fig. 6, element 62, col. 4, lines 48-50; col. 10, lines 52-56

and col. 11, lines 19-34), wherein after the first portion of the WDM optical signal propagates

through the polarization controller and the polarizer, the wavelength dispersive element

disperses the first portion of the WDM optical signal into a plurality of spectral components

corresponding to the plurality of WDM channels; and the photo-detector array detects the

plurality of spectral components (col. 11, lines 19-34). It would have been obvious to one of

ordinary skill in the art at the time of the invention to use the polarization analyzer disclosed by

Erdogoan et al., in the system of Moeller, in order to make polarization measurements for

multiple wavelengths simultaneously transmitted through the system.

Regarding claim 33, Moeller disclose an apparatus for determination of polarization

mode dispersion in an optical fiber, comprising: a polarization switch connected to an input of

the optical fiber characterized by a polarization mode dispersion (fig. 1, element 120 and

paragraph 0007); and a polarization analyzer connected to an output of the optical fiber (fig. 1,

element 140), but does not disclose that the polarization analyzer comprises a polarization

controller, a polarizer, a wavelength dispersive element and a photo-detector. Erdogan et al.

disclose a polarization analyzer including a polarization controller, a polarizer, a wavelength

dispersive element and a photo-detector (fig. 6, element 62; col. 4, lines 48-50; col. 10, lines 52-

56; and col. 11, lines 19-34). It would have been obvious to one of ordinary skill in the art at the

time of the invention to use the polarization analyzer disclosed by Erdogoan et al., in the system

of Moeller, in order to make polarization measurements for multiple wavelengths simultaneously

transmitted through the system.

Regarding claim 34, Moeller in view of Erdogan et al. disclose that the wavelength

dispersive element is a diffraction grating (Erdogan et al.: col. 11, lines 19-34).

Regarding claim 35, Moeller in view of Erdogan et al. disclose that the photo-detector is

a photodiode array (col. 11, lines 19-34).

Regarding claim 38, Moeller discloses a system for with a transmitter and a polarization

switch connected to the transmitter (fig. 1, elements 102 and 120); a transmission fiber

connected to the output of the polarization switch (fig. 1, element 106), where the transmission

fiber is characterized by PMD (paragraph 0007); a polarization analyzer for receiving a first

portion of the optical signal transmitted through the transmission fiber (fig. 1, element 140); a

controller for generating a control signal responsive to a signal received from the polarization

analyzer (fig. 1, element 150); and a PMD compensator responsive to the control signal (fig. 1,

element 112), for converting a second portion of the optical signal transmitted through the

transmission fiber into a PMD-compensated optical signal (fig. 1, element 190b and paragraph

0024. Moeller does not disclose that the signal is a WDM signal. Erdogan et al. disclose a

system for taking polarization measurements of an optical signal comprising a polarization

controller, a polarizer, a wavelength dispersive element and a photo-detector array (fig. 6,

element 62; col. 4, lines 48-50; col. 10, lines 52-56; col. 11, lines 19-34). Erdogan et al. also

disclose that the system takes polarization measurements of a multi-wavelength data signal

(col. 1, lines 10-22 and col. 11, lines 19-34), which is inherently a WDM signal in a WDM

system, and where a WDM system inherently contains a plurality of transmitters for generating a

plurality of optical signals corresponding to a plurality of optical channels; a multiplexer for

combining the plurality of optical signals into a multiplexed optical signal; a demultiplexer

connected decomposing the multiplexed optical signal into a plurality of optical signals

corresponding to the plurality of channels in the WDM system; and a plurality of receivers for

detecting the plurality of demultiplexed optical signals.

12.   Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moeller (US

Published Patent Application No. 09/518296) in view of Erdogan et al. (US Patent No. 6211957)

as applied to claims 28-30, 32-35 and 38 above, and further in view of Favin et al. (US Patent

No. 5371597).

       Regarding claim 31, Moeller in view of Erdogan et al. disclose directing an optical signal

into a polarization controller and a polarizer (Erdogan et al.: fig. 6, element 62, and col. 4, lines

48-50 and col. 10, lines 52-56); and sequentially directing the optical signal from the combined

polarization controller and polarizer to four wavelength dispersive elements at different rotations

(Erdogan et al.: col. 5, lines 1-60) to generate a dispersed optical signal comprising a plurality of

spectral components each characterized by a wavelength range and by one of four polarization

measurements and directing the four dispersed optical signals into four photo-detectors for

detecting the plurality of spectral components for each of the four polarization measurements,

and measuring the power of the spectral components using photo-detectors (Erdogan et al.: col. 11, lines 19-40); and obtaining the polarization state of the optical signal by analyzing the powers of the optical signal (Erdogan et al.: col. 2, lines 11-24; col. 6, line 23 to col. 7, line 14; and col. 10, lines 52-59). Erdogan et al. do not disclose setting the polarization controller to a plurality of positions in taking the four polarization measurements. Favin et al. disclose an optical signal going through a polarizer and a polarization controller and setting the polarization controller to a plurality of positions in obtaining four different polarization measurements (col. 4, line 61 to col. 5, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention that a rotating polarization controller could be used to obtain the four different polarization measurements, as disclosed by Favin et al., in the apparatus of Erdogan et al., eliminating the need for four different wavelength dispersive elements each set at a different rotation, and four different detectors corresponding to the four wavelength dispersive elements, for obtaining the four different polarization measurements.

13.   Claims 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moeller (US Published Patent Application No. 09/518296) in view of Erdogan et al. (US Patent No. 6211957) as applied to claims 28-30, 32-35 and 38 above, and further in view of Damask (US Patent No. 6377719).

Regarding claims 36 and 37, Moeller in view of Erdogan et al. disclose lithium niobate used in the polarization analyzer (paragraph 0056), but do not disclose that the polarization controller within the polarization analyzer is an electro-optic device. Damask discloses an electro-optic lithium niobate polarization controller used for transforming the state of polarization of a signal (col. 4, lines 27-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to use an electro-optic lithium niobate polarization controller, disclosed

by Damask, in the system of Moeller in view of Erdogan et al., because of the small size of a

lithium niobate polarization controller.

Allowable Subject Matter

14.   Claim 8 is objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

Conclusion

15.   Any inquiry concerning this communication from the examiner should be directed to N.

Curs whose telephone number is (703) 305-0370. The examiner can normally be reached M-F

(from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jason Chan, can be reached at (703) 305-4729. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306. Any inquiry of

a general nature or relating to the status of this application or proceeding should be directed to

the receptionist whose telephone number is (703) 305-4700.

JASON CHAN
SUPERVISORY PAT
TECHNOLOGY C